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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,939	04/14/2004	John William Krawczyk	2004-0090.02	5281

21972 7590 11/24/2006

LEXMARK INTERNATIONAL, INC.  
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EXAMINER

MARTIN, LAURA E

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 11/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/823,939		KRAWCZYK ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Laura E. Martin		2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-10, 12-16, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 4, 11, 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-10, 12-16, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beerling (5861902) in view of Wang et al. (US 20020113846).

#### **Beerling et al. discloses the following claim limitations:**

As per claims 1-3, 8-10, and 14-16, Beerling teaches a micro-fluid ejection assembly, a substrate for an ink jet printhead heater chip, and a microfluid ejection assembly having a silicon substrate (column 7, line 61-column 8, line 9; figures 3a-3g) having accurately formed fluid paths therein, the fluid paths being formed by an etching process conducted on a substrate having a surface characteristic selected from the group consisting of a dielectric layer thickness of no more than about 5000 Angstroms and a substantially dielectric material free pitted surface wherein a root mean square depth of surface pitting is less than about 500 Angstroms and a maximum surface pitting depth is no more than about 2500 Angstroms (column 9, lines 1-47). Beerling also teaches the surface characteristic comprising an oxide thickness ranging from 200 to 5000 Angstroms (column 9, lines 34-47).

#### **Beerling et al. does not disclose the following claim limitations:**

As per claims 1, 8, and 14: In this particular embodiment, Beerling does not teach the etching process to be deep reactive ion etching. In another embodiment Beerling teaches the etching to be a dry etching (column 14, lines 1-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to use deep reactive ion etching as the preferred method of etching on all embodiments taught by Beerling, to improve the quality of the fluid paths.

As per claims 1, 8, and 14: forming paths by using deep reactive ion etching.

**Wang et al. discloses the following claim limitations:**

As per claims 1 and 14: forming paths by using deep reactive ion etching [0011].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the assembly taught by Beerling et al. with the disclosure of Wang et al. as deep reactive ion etching is a particular type of dry etching which is advantageous over wet chemical etching.

***Allowable Subject Matter***

Claims 4, 11, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: prior art does not teach or suggest a microfluidic ejection assembly comprising a dielectric surface having the surface characteristic of a substantially oxide free pitted

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surface wherein a root mean square depth of the surface pitting is less than about 500 A and a maximum surface pitting depth is no more than about 2500 A. Prior art also does not teach or suggest an obvious modification between current art not dealing with ejection assemblies.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura E. Martin whose telephone number is (571) 272-2160. The examiner can normally be reached on Monday - Friday, 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Laura E. Martin

  
11/21/06  
MANISH S. SHAH  
PRIMARY EXAMINER